

Doc. 300.3.2

Date: 24/07/2023

Higher Education Institution's Response

(Departmental)

- **Higher Education Institution:**
University of Cyprus
- **Town:** Nicosia
- **School/Faculty:** School of Pure and Applied Sciences
- **Department:** Department of Physics
- **Programme(s) of study under evaluation**
Name (Duration, ECTS, Cycle)

Programme 1

In Greek:

Πτυχίο στη Φυσική (4 έτη/240 ECTS/1^{ος} κύκλος)

In English:

Bachelor's in Physics (4 years/240 ECTS/1st cycle)

Programme 2

In Greek:

Μάστερ στη Φυσική (2 έτη/120 ECTS/2^{ος} κύκλος)

In English:

Master's in Physics (2 years/120 ECTS/2nd cycle)

Programme 3

In Greek:

Διδακτορικό στη Φυσική (4 έτη/240 ECTS/3^{ος} κύκλος)

In English:

PhD in Physics (4 years/240 ECTS/3rd cycle)

- **Department's Status:** Currently Operating



The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the “Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws” of 2015 to 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Guidelines on content and structure of the report

- *The Higher Education Institution (HEI) based on the External Evaluation Committee's (EEC's) evaluation report (Doc.300.3.1) must justify whether actions have been taken in improving the quality of the department in each assessment area.*
- *In particular, under each assessment area, the HEI must respond on, without changing the format of the report:*
 - *the findings, strengths, areas of improvement and recommendations of the EEC*
 - *the deficiencies noted under the quality indicators (criteria)*
 - *the conclusions and final remarks noted by the EEC*
- *The HEI's response must follow below the EEC's comments, which must be copied from the external evaluation report (Doc. 300.3.1).*
- *In case of annexes, those should be attached and sent on a separate document.*

1. Department's academic profile and orientation

Sub-areas

- 1.1 **Mission and strategic planning**
- 1.2 **Connecting with society**
- 1.3 **Development processes**

This document is a response from the Department of Physics at the University of Cyprus to the report provided by the External Evaluation Committee (EEC) to the Cyprus Agency of Quality Assurance and Accreditation (CYQAA) in Higher Education. The report of the committee was presented to the Agency and given to the Department of Physics on April 18, 2023. The EEC visited the University of Cyprus and the Physics Department for two full days on April 10 and 11, 2023, had meetings with the University officials, the Department's faculty members, administrative staff and student representatives and had a tour of the teaching and research laboratories.

The report was discussed extensively during dedicated Departmental Council meetings (03/05/2023 and 02/06/2023). The faculty members of the Department express their sincere thanks and appreciation for the manner the visit was conducted and acknowledge that the suggestions and recommendations of the EEC are extremely useful. As described in this document, corrective actions that conform to the suggestions and recommendations of the committee have been already taken to address the issues raised. Some of the issues require actions at the University level in order to be fully addressed.

The recommendations below are copied from the body of the EEC report and our response follows the same order.

EEC Comments:

Areas of improvement and recommendations

1. *The age profile of the Department shows that a large number of the academic staff will reach the age of retirement within the next couple of years. The Department will have to face the challenge of evolving in the next generation and the University has to take actions towards the replacement of the resulting vacancies.*
2. *Funding of the PhD students who also assume duties of Teaching Assistants guarantees continuity in both teaching and research and it is strongly recommended.*

1. The mission of the Department is to prepare future educators and researchers in Physics, to promote research in areas of fundamental and applied Physics, and to assist in the technological upgrading and economic development of Cyprus. The EEC has identified certain strengths of the Department conformant to this aim, such as a "strong research orientation and publications in internationally leading journals," "commitment to high level teaching," "very positive reputation, with graduates pursuing successful careers in academia and various branches of the industry," "strong international character as evidenced by joint publications and participation in EU-funded programs," as well as "important contributions to the Society regarding the writing of High-School Physics textbooks for both Senior and Junior High".

The Department is truly dedicated and committed to fulfilling its mission and its strategic goals, which include the continual enrichment of the course curriculum, increasing the number of incoming students, maintaining a high level of research activity in both fundamental and applied areas of physics, increasing the external sources of funding, maintaining and even increasing the number of faculty members and replacing the upcoming retirements, as well as the expansion into novel, internationally booming areas of physics.

We fully agree with the EEC that in order to face the challenge of the upcoming retirements of as much as 50% of the current faculty members, and in order not to compromise compliance towards fulfilling the mission of the Department, the University needs to take immediate actions towards the replacement of all the resulting vacancies. One faculty member has already retired in 2020 and seven (7) additional faculty members will retire within the next five years. The Department has already contacted and submitted to the Rector's Council, the Planning and Development Committee and the Dean of the School of Pure and Applied Sciences a detailed analysis of its needs in faculty personnel due to the upcoming retirements, taking into account its strategic plan for the period 2021 – 2025. We are expecting concrete feedback from the University Authorities and the allocation of new faculty positions in order to initiate the process of filling all vacancies due to retirements. Currently, we are finalizing the recruitment procedures of two faculty members in theoretical particle physics, at the level of Assistant Professor. The new faculty members are expected to join the Department within the next Academic year.

The University of Cyprus is committed in providing the necessary resources to the Departments in order to address their educational and research goals. We expect the University Authorities to prioritize and fully support excellent Departments, including the Physics Department, which have achieved excellent evaluations by International Evaluation Committees and have maintained good rankings in prestigious international academic lists, such as the Shanghai list.

The Department of Physics aims towards research and teaching excellence; consequently, it places great emphasis on attracting new academic staff conformant to this aim. Our strategic goals aim at maintaining diversity in research areas, strengthening existing research areas, but also remaining open to recruit excellent candidates in new areas of Physics, which are at the forefront of research. As discussed with the EEC, cutting edge directions in Physics such as quantum computing, new materials – nanophysics – quantum and biomaterials, computational physics – data science – machine learning and their applications to elementary particle physics and biophysics, astroparticle physics and cosmology, elementary particle physics and ongoing international experiments and applications, and applications to medical physics can form the basis of future appointments and also create synergies with the present faculty members. Recruiting excellent candidates in these areas can help the Department face the challenge of evolving in the next generation and ensure continuity in research and teaching excellence. Following the suggestions of the EEC, the Department has recently decided to include new courses on quantum computing and machine learning in both the undergraduate and graduate curriculum in order to facilitate expansion into these novel areas.

2. The Department of Physics makes extensive efforts to secure funding for PhD students via competitive grants through the Cyprus RIF and EU programmes, joint European Doctorate programmes, and other income resources. Apart from competitive funding, PhD students in good standing have been supported via the Evagoras Scholarship programme of the University, coverage of tuition fees via departmental own income funds, and teaching and research assistantships. It is very important for the University Authorities to reinstate and expand further the Evagoras Scholarship programme, supporting excellent PhD students, and allocate a larger portion of the University budget towards this aim. We fully agree with the EEC that the adequate funding of PhD students guarantees continuity in both teaching and research, which is imperative for the Department. The faculty members will intensify their effort for securing competitive funding to support PhD studies at the Department of Physics. A new European joint Doctorate programme, AQTIVATE, which will provide full scholarships for PhD studies at the Department, has now begun its operation. The University and

the School of Graduate Studies should prioritize and develop a central policy to support PhD studies in areas of fundamental research, including efficient redistribution of the University's own income via overheads and tuition fees for this purpose.

2. Quality Assurance

Sub-areas

- 2.1 System and quality assurance strategy
- 2.2 Quality assurance for the programmes of study

EEC Comments:

Areas of improvement and recommendations

There is ample room for improvement in ascertaining that a constant flow of support exists for incoming graduate students, so that quality in teaching support can be maintained at high level.

As mentioned above, the Department of Physics makes an all-out effort to secure funding for incoming graduate students, who also serve as teaching assistants in undergraduate courses, via competitive grants and other own income resources. The University should expand further the Evagoras Scholarship programme, supporting excellent PhD students, and allocate a larger portion of the University budget towards funding PhD studies in fundamental disciplines of research. Teaching Assistantships should be funded centrally in order to ensure continuous funding and a constant flow of support for PhD students and maintain the quality of the teaching support provided at high level.

3. Administration

EEC Comments:

Areas of improvement and recommendations

1. *One of the Department's priorities should be the recruitment of new technical personnel and the update of their job description as they obviously act as teaching assistants in laboratories.*
2. *New secretarial personnel should be employed and undergo professional training.*

1. The Department has filed a request to the University Authorities so as to hire two new lab technicians. In addition, we have requested for an additional IT assistant, who can also help at the teaching computer labs. These positions will greatly enhance the technical support provided to the Department. The Departmental Council encourages the administrative personnel in participating in training seminars and programmes, organized both at the University and abroad, via Erasmus programmes, which can help them acquire further skills and experience. The Department also recognizes the need to update job descriptions of the lab technicians, since these indeed help in teaching laboratories. Future job announcements should specify technical support duties more clearly, and in particular regarding teaching labs. For this purpose, we plan to contact the Human Resources Department in order to facilitate these updates.

2. We agree with the EEC, and the Human Resources Department should make an all-out effort providing efficient professional training of new secretarial personnel. Upcoming retirements will also affect the administrative personnel of the Department and the University should take actions towards the replacement of the resulting vacancies.

4. Learning and Teaching

Sub-areas

4.1 Planning the programmes of study

4.2 Organisation of teaching

EEC Comments:

Areas of improvement and recommendations

Every effort should be made so that sufficient funds are secured for the Department aiming at:

- 1. sustaining/growing the number of faculty members necessary to support the existing curricula and their evolution towards emerging fields.*
- 2. supporting and motivating the Teaching Assistants to continue their studies in higher education*
- 3. maintaining and updating teaching and research equipment.*
- 4. enabling access to textbooks (e.g. electronic copies)*

1. We absolutely agree with the EEC that every effort should be made on behalf of the Institution to allocate new faculty positions in order to fill vacancies due to the upcoming retirements, and even increase the number of faculty members. This will guarantee the continual support of the existing curricula and the implementation of new emerging fields and courses.

2. As discussed above, continuous support and funding should be provided to the PhD students who serve as Teaching Assistants in undergraduate courses. This will help them focus on their PhD studies and towards the implementation of their research programmes.

3. The faculty members have been successful in securing infrastructure competitive grants, which provided for research and laboratory equipment as well as computational resources, and they will intensify their effort in the future. The University should further enhance the departmental budget and allocate adequate money for maintaining and updating computer and laboratory equipment in both the teaching and research laboratories. We are coordinating our efforts with other Departments in the School of Pure and Applied Sciences in order to ensure a continuous flow of support towards maintaining and updating research and teaching equipment.

4. The Department in consultation with students and the course instructors will file requests to increase the number of available copies of teaching textbooks and electronic copies at the library.

5. Teaching Staff

EEC Comments:

Areas of improvement and recommendations

Every effort should be made so that sufficient funds are secured by the Department for the maintenance of teaching and research equipment and staff. This will help to reduce the amount of time necessary for the completion of graduate studies. Moreover, the lack of predictable, continuous funding of doctoral students forces them to take up external jobs and causes long delays in the completion of their doctoral work.

A necessity exists for hiring more technicians.

The Committee encourages the faculty members to enhance advertising of the Department's educational programs. Furthermore, the Committee strongly believes that the number of students enrolled in the Department should be increased via the introduction of new and hot topics (machine learning, AI, quantum computing etc.), in order to maintain the good quality of the program.

The first two points of the EEC have been addressed above. We fully agree that continuous funding of doctoral studies is imperative in order to avoid delays in the completion of doctoral and research work.

The Department will intensify its efforts in advertising its educational programmes with the organization of more visits to both public and private high schools, participation/organization of open days, summer internships aimed at excellent high school students interested in physics, open days for Turkish Cypriot students and students from Greece. We will also enhance the visibility of the Department in the social media.

The Departmental Council has already decided to introduce two new specialization courses on quantum computing and machine learning in the undergraduate curriculum. The syllabus of an existing undergraduate specialization course will be updated in order to include topics on quantum technologies. The syllabi of core and introductory courses will be updated in order to provide introduction to emerging fields such as quantum computing and quantum technologies. Courses on quantum computing and machine learning will also be introduced in the graduate programmes. We believe that these additions will enhance the quality and attractiveness of the programmes of study.

The Department will intensify its efforts to attract more undergraduate and graduate students maintaining also the quality of the programmes of study.

6. Research

EEC Comments:

Areas of improvement and recommendations

- 1. Research continuity and research-related outputs are compromised due to the lack of reliable and predictable national funding sources as well as due to the interruption of previously established fellowship programs supporting doctoral students. Efforts should be made to remedy these deficiencies at a national level.*
- 2. The funding opportunities offered by EU programmes (Marie-Sklodowska-Curie, Horizon Europe etc.) should be further aggressively pursued by faculty members.*
- 3. The Committee recommends that University policy regarding hiring practices should offer automatic tenure-track positions to ERC-Grant winners.*

1. We fully agree with the EEC. Research continuity is imperative and should not be compromised due to the lack of reliable and predictable national funding sources. The Department in coordination with the School of Pure and Applied Sciences and the University authorities has sent letters to the Cyprus R. I. F. stressing the importance of continuous support of fundamental research and the launching of new competitive programs aiming to support excellent PhD students and post-doctoral researchers. The University can help in order to remedy these deficiencies and push for national efforts towards this aim. The University should also enhance and expand scholarship programs for graduate students in fundamental and applied sciences.

2. The faculty members will intensify their efforts to continue to secure EU funding via Marie-Sklodowska-Curie actions, Horizon Europe programmes, COST actions and Networks and European joint Doctorate programmes. The Department has been very successful in administering two European joint Doctorate programmes and securing a third one, which has been launched this year. One of our faculty members, Prof. Costas Christofides, together with collaborators from the Department of Electrical Engineering, has recently achieved to secure a prestigious Teaming for Excellence grant, called PHAETHON, of 45 million Euro. Another such proposal is to be submitted by Prof. Constantia Alexandrou on topics concerning quantum computing and quantum communication.

3. We fully agree with the committee and the recommendation will be forwarded to the University Authorities for possible action.

7. Resources

EEC Comments:

Areas of improvement and recommendations

- 1. The maintenance of building infrastructure is on several occasions insufficient and therefore putting at risk proper operation of expensive and specialised research equipment.*
- 2. The Committee strongly suggests that the University Administration allocate to the Department of Physics a larger budget in order to cover the Department's regular needs.*

1. We are in close contact with the Infrastructure Committee regarding departmental needs concerning building infrastructure and maintenance. We will continue to monitor our research labs, which contain expensive state-of-the-art equipment, and plan accordingly in consultation with the technical services. In any case careful planning and close contact with the technical services is needed also in designing for future labs. The University has to enhance the budget of the Department in order to be able to update and maintain research and teaching equipment.

2. We fully agree with the EEC in that the University Authorities should allocate to the Physics Department a larger budget in order to cover our regular needs and in order not to compromise the smooth implementation of our mission.

B. Conclusions and final remarks

The Physics Department is the only tertiary education Institution in Cyprus offering undergraduate and graduate programmes and cutting-edge research in Physics. As the EEC recognizes it is “indispensable that the Department not only continues but also strengthens and expands its operation after the “generation change” induced by upcoming retirements of as much as 50% of its current staff.” The University Authorities should allocate faculty positions to the Department in order to fill the resulting vacancies and not compromise in any way the smooth implementation of the Department’s mission.

The Department is committed in attracting excellent personnel, capable of producing high quality, cutting-edge research and supporting high quality educational programmes. It is our intention and part of our strategic plan to expand into novel, internationally booming areas of Physics, as suggested and discussed thoroughly with the EEC. Cutting-edge directions in Physics such as quantum computing, new materials – nanophysics – quantum and biomaterials, computational physics – data science – machine learning and their applications to elementary particle physics and biophysics, astroparticle physics and cosmology, elementary particle physics and ongoing international experiments and applications, and applications to medical physics can form the basis of future appointments and provide a succession plan to address the challenge of the upcoming retirements. Excellent candidates in these areas will certainly help the Department face the challenge of evolving into the next generation and ensure continuity in research and teaching excellence and visibility at the international level.

C. Higher Education Institution academic representatives

<i>Name</i>	<i>Position</i>	<i>Signature</i>
Assoc. Prof. Nicolaos Toumbas	Chairperson	
Assoc. Prof. Spiros Skourtis	Vice Chairperson	
Assoc. Prof. George Archontis	Coordinator of Undergraduate Studies	
Prof. Fotios Ptochos	Coordinator of Graduate Studies	
Prof. Haralambos Panagopoulos	Member of the Departmental Quality Insurance Committee	

Date: 24/07/2023

